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Synopsis of the SCOLYTIDÆ of America North of Mexico.

BY C. ZIMMERMANN, M. D.,

WITH NOTES AND AN APPENDIX BY J. L. LECONTE, M. D.

[Among the MSS. of my deceased friend, Dr. Zimmermann, I find several partially completed memoirs, which contain not only systematic ideas of much value, but descriptions of many new species belonging to our fauna. His widow having kindly submitted the whole of the MSS. to me for examination, it is my intention from time to time to select such groups as have not yet received attention from American students, and to present extracts from the MSS. which will secure for future reference at least a portion of the labor of the author; it is a subject of regret to me, that the different memoirs which he prepared were not furnished for publication without delay, for I find in them improvements in classification, unknown at the time of writing, though the most important have been since developed by other observers.

On the present occasion, I give the result of his investigation of the family of Rhynchophora, known as SCOLYTIDÆ but in the MSS. called HYLURIDÆ, for reasons which are detailed below.

The Scolytidae are distinguished from the other families of Rhynchophora by the 3rd tarsal joint not being received in the 2nd, the antennæ strongly clubbed and geniculate, and by the tibiæ being serrate on the outer margin.*

For the purpose of rendering the present contribution more complete I have added descriptions and references to species in my own collection, not mentioned in the MS. memoir before me; and where the views of other systematists differ from those of our author in regard to the limits of genera, I have called attention to the fact.

The family HYLURIDÆ being thus defined by Dr. Zimmermann is divided by him into the following tribes:

* Dr. Zimmermann has in a pencil note marked for investigation the relations between the present family and the *Apatidæ*, (Bostrichidæ of most authors); although there is much resemblance in form, and to a certain extent in habits between the two types, the latter fails in what I have regarded (*Am. Journ. Sc.* 1867, xlv,) as the defining character of the Rhynchophora, viz. the enclosure of the posterior extremity of the prosternum by the side pieces of the prothorax. The resemblance between the two families in question is similar to that between Brenthidæ and Colydiidæ, or Rhyssodidæ; or that between Anthribidæ and certain Cerambycidæ. To take a more familiar example, it is like the repetition of forms observed in comparing Marsupials with placental Mammals.

" I.—**BOSTRYCHI**: tarsi filiform, evidently 5-jointed; beak obsolete; containing *Platypus*, *Crypturgus*, *Xyloterus*, *Bostrichus*.

II.—**ECCOPTOGASTERES**: 3rd joint of tarsi bilobed; beak very short and thick; ventral segments of abdomen excavated; containing *Eccoptogaster*.

III.—**HYLURGI**: 3rd joint of tarsi bilobed; beak very short and thick; abdomen cylindrical; containing *Phlæotribus*, *Hylesinus*, *Dendroctonus*, *Hylurgus*."—LEC.]

Tribe I.—**BOSTRYCHI**.

The beak is scarcely developed, but the great resemblance of these beetles in the method of life, and the structure of the body, (both in the larva and the perfect insect), with the genuine *Hylurgi*, demonstrates their true position in the system. They are distinguished from allied groups by the filiform tarsi, the 3rd joint of which is not dilated or bilobed.

Club of antennæ without trace of articulation; eyes round.

1. Prothorax truncate in front; elytra depressed; 1st joint of tarsi as long as the others united.*.....**Platypus** Herbst, V. 128.

Club of antennæ articulated, eyes transverse, emarginate.

2. Prothorax with a hood-like extension over the head; elytra not depressed; 1st joint of tarsi short; the subgenera are:

a. The separation between the three joints of the antennal club transverse and visible both on the inner and outer surface of the club.

Crypturgus Er.

b. The separation between the joints of the antennal club concentric, and visible only on the anterior surface, being covered on the other side by the first joint.....**Xyleborus** Er.

c. The three joints of antennal club separated from each other as in *Crypturgus*, but only visible on the anterior surface, being concealed on the other as in *Xyleborus*.....**Bostrychus** Fabr. Syst. 59.

CRYPTURGUS Er.

All the species belonging to this genus have the tibiæ compressed but slender, and scarcely dilated towards the tip; according to differences in the form of the prothorax, the front femora, and other parts of the body they may be arranged in three divisions.

A.—Prothorax longer than wide; antennal club fringed at the sides with long hairs; front femora toothed at tip; outer surface of the anterior tibiæ, as in *Platypus*, with teeth like transverse ridges.†

* No new species are described in the part of the memoir relating to *Platypus*, which is therefore omitted.—LEC.]

† This division corresponds with the genus *Corthylus* Er., which differs from *Crypturgus* by the funiculus of the antennæ consisting of but one joint, instead of two. The plan of arrangement pursued by the author does not take cognizance of the number of joints of the funiculus, and therefore definitions of the the two genera naturally fall together.—LEC.]

C. fasciatus.—*Bostrichus fasciatus* Say, Journ. Acad. Nat. Sci. V. 255.—Long. $1\frac{1}{4}$ lin. Elongate cylindrical, piceous, antennæ and feet ferruginous yellow; elytra yellow in front, black behind, the latter color commonly extending forwards along the suture; prothorax long, tuberculate and slightly hairy in front; elytra very finely punctate-striate, glabrous and shining, at the tip obliquely truncate, and thickly clothed with yellow silky hairs; the margin of the declivity is acute, and there is a small tubercle near the suture. [Found throughout the Atlantic States.—Lec.]

C. [mali.]—*Tomicus mali* Fitch, Noxious Insects of New York, ii, No. 5.]—Long. 1 lin. Brown, base of thorax and elytra paler; antennæ and feet ferruginous yellow; very similar to *C. fasciatus*, but smaller, with the rows of punctures of the elytra scarcely visible; the oblique truncation of the tip is glabrous, and there are two small teeth near the suture.—Maryland. [Also found in the Southern States and in Canada.—Lec.]

B.—Prothorax longer than wide; antennal club not fringed with hairs; anterior femora not toothed at tip; front clothed more or less thickly with silky hair.

C. [materiarius.]—*Tomicus mat.* Fitch, Noxious Ins. New York, ii, No. 246.]—Long. $1\frac{1}{4}$ lin. Elongate cylindrical, shining brown, base of elytra paler; head and under surface black; antennæ and feet yellow; front somewhat impressed, thickly punctured, hairy; prothorax long, finely tuberculate in front, smooth behind; elytra very smooth, with scarcely visible rows of punctures rounded behind, without tubercles, thinly clothed with short yellow hairs.—North Carolina. [Also found in the Northern States and in Canada.—Lec.]

C. comatus Zimm.—Long. $\frac{3}{4}$ lin. Brown, antennæ and feet yellow; prothorax roughly tuberculate in front, ornamented each side with a patch of thick yellow silky hair; elytra very finely but distinctly punctate-striate, obtusely rounded at tip and without tubercles. South Carolina.

C. minutissimus Zimm.—Long. $\frac{3}{4}$ lin. Cylindrical, slender, black, antennæ and feet pale brown; front clothed with long yellow hairs; prothorax roughly tuberculate in front, smooth and shining behind; elytra clothed with a fine short gray pubescence; behind obtusely rounded, without tubercles.—Carolina. [Also found in the Northern States; I have received this species from Dr. Mel-sheimer as *Tomicus pusillus* Harris, Trans. Nat. Hist. Soc. Hartford, 83, and it certainly agrees with the description better than any other species known to me. The one referred by Dr. Fitch, Noxious Insects of New York, ii, No. 245 to Harris' species seems to be quite different, by the prolonged acute suture and may belong to the group *Pityophthorus*, with the European *ramulorum*, to which he compares it; the description of Dr. Fitch otherwise corresponds with the next species.—Lec.]

C. pullus Zimm.—Long. 1 lin. Somewhat smaller and narrower than the European *C. chalcographus*, but very similar to it; dark brown, antennæ and feet ferruginous yellow; front scarcely hairy; prothorax roughly tuberculate in front, punctured behind, with a faint smooth dorsal carina; elytra glabrous, distinctly punctured, but not in rows since the intervals between the rows are punctured as strongly as the rows themselves; along the suture there is a faint longitudinal groove; the tip is rounded, but the margin of the declivity is elevated and armed with two or three slight spines. South Carolina.

C. pulicarius Zimm.—Long. $\frac{1}{2}$ lin. Brown or ferruginous, antennæ and feet yellow; head thickly punctured, with a slight impression upon the front, anterior margin thickly fringed with long yellow hair; prothorax somewhat longer than wide, roughly tuberculate in front, thickly and finely punctured behind; elytra strongly punctured, but not in rows, impressed along the suture behind the middle, the tip rounded. [Dr. Zimmermann refers to this species *T. pusillus* Harris Trans. Hartford Nat. Hist. Soc. I, 82, but it appears to me to belong rather to *C. minutissimus*. In any event the name must be changed as it was previously used for a European species, now belonging to the genus *Crypturgus*.—LEC.]

C. punctatissimus Zimm.—Long. $1\frac{1}{2}$ lin. Short thick, compressed, shining black, antennæ and feet ferruginous; front glabrous; prothorax roughly tuberculate in front, shining behind, with fine sparse punctures; elytra punctured strongly, but not in rows, behind rounded, without furrows or teeth.—South Carolina. [This species is the type of Erichson's genus *Corthylus*, and is usually regarded as *Bostrichus compressicornis* Fabr., but probably without sufficient reason, the locality of that insect having been given as South America.—LEC.]

C.—Prothorax above nearly circular; anterior femora slender.

C. dissimilis Zimm.—Long. 1 lin. Stout, elevated, black, antennæ and feet yellow; front clothed with fine silky hair; prothorax not longer than wide, strongly convex, thickly punctured, finely pubescent, before the middle marked with erect acute spines; elytra cylindrical, punctate-striate, finely pubescent with gray hair, rounded at the tip.—North Carolina. [I have specimens of this species from the Southern States and Lake Superior; the intervals between the elytral rows of punctures are finely and sparsely punctured.—LEC.]

XYLEBORUS Eichhoff.

In the species of this group the tibiæ are strongly compressed and dilated; the body is cylindrical, obliquely truncate behind or flattened, or marked near the suture with two or more small teeth or tubercles. According to differences in the form of the body the following divisions may be established.

A.—Middle and hind tibiæ rounded on the outer margin, finely serrate; prothorax strongly convex.

X. tachygraphus Zimm.—Long. $1\frac{1}{2}$ lin. Brown, antennæ and feet ferruginous yellow; prothorax not longer than wide, roughly tuberculate, more coarsely in front than behind, thinly pubescent; elytra short cylindrical, behind obtusely rounded, punctate-striate, the intervals also punctured, with fine rows of hairs, and behind also with small elevated teeth.—North Carolina. [This species is also found in Pennsylvania.—LEC.]

X. pyri.—*Scolytus pyri* Peck, Mass. Agr. Journal, 1817.—Long. $1\frac{1}{2}$ lin. Of the same size and form as *X. tachygraphus*, but of a shining black color, with the antennæ, tibiæ and tarsi ferruginous yellow; prothorax covered in front with sharp tubercles arranged in transverse rows, behind nearly smooth; the whole surface is thinly clothed with fine white hairs; elytra punctate-striate, obliquely flattened behind, the intervals finely punctured and pubescent, the 7th acutely elevated towards the tip.—Massachusetts. [Also found in Pennsyl-

vania; the elevation of the 7th interval forms the acute margin of the apical oblique declivity of the elytra, and also exists in the preceding species; it is however somewhat serrate in that, but quite entire in the present.—LEC.]

X. [celsus] Eichh. Berl. Ent. Zeitschr. 1867, 400.]—Long. 2 lin. Ferruginous, clothed with yellow hair; entirely of the form of the European *X. monographus*, but larger, and distinguished by the elytra being obliquely declivous behind, perfectly flat, smooth, with two larger acute pointed tubercles each side near the suture, and near the edge of the declivity with many smaller acute elevations.—South Carolina. [This species is also found under oak bark in the Northern States. It differs from the two preceding species by its much more elongate form, the prothorax being about one-half longer than wide, with the sides parallel behind the middle and the elytra more than one-half longer than the thorax.—LEC.]

X. [fuscatus] Eichh. Berl. Ent. Zeits. 1867, 400.]—Long. 1—1½ lin. Ferruginous brown, or yellow, thinly clothed with gray hair, with the same form and sculpture as *X. monographus*, but somewhat smaller, and distinguished by the oblique declivity of the elytra being marked by only a single large acute tubercle, while the suture itself is also distinctly elevated. This and the allied species *X. monographus* and *celsus* are found under oak bark.—Atlantic States. [I observe in the typical specimens, besides the large acute tubercle mentioned, three or four very small denticles in the upper part of the declivity of the elytra. A nearly allied species having two smaller tubercles each side near the tip of the elytra was found by me under pine bark in Georgia, and is described in the appendix to this paper.—LEC.]

X. xylographus.—*Bostrichus xylogr.* Say, Journ. Acad. Nat. Sc. v, 256.—Long. 1½ lin. Ferruginous, with yellow hair, of the form and sculpture of *X. monographus*, but smaller, and differing by the oblique declivity of the elytra being rounded, and marked with rows of very small denticles; the suture is not elevated as in *X. conformis*.—Atlantic States. *X. ferrugineus* Fabr. from Cuba, is a very similar and closely allied species, with which this must not be confounded.

X. pubescens Zimm.—Long. 1 lin. Ferruginous, elytra brown, antennæ and feet yellow; of the form of the preceding, but narrower; the prothorax is longer than wide, roughly tuberculate in front, smooth behind, clothed with very fine white hairs; elytra finely punctate-striate, the intervals each with a row of erect hairs; posterior declivity rounded, and marked with small denticles on the slightly elevated 1st and 3rd intervals.—Southern States. [A close examination shows two smaller denticles towards the tip on the 5th interval. This species is closely allied to *X. xylographus*, but differs by the punctures of the elytra being larger, and the hairs longer, the small punctures of the hind part of the thorax are also more evident, and the denticles of the posterior declivity of the elytra are fewer, being scarcely more than two on each of the alternate intervals.—LEC.]

B.—Middle and hind tibiæ as in division **A**; prothorax at least in the males, impressed or deeply excavated in front.

X. planicollis Zimm.—Long. 1 lin. Ferruginous; front smooth and flat; prothorax with a shallow impression, almost as wide as long, very finely and thickly punctured, and clothed on its anterior half with fine silky hair; elytra

short cylindrical, obliquely declivous behind, without tubercles or denticles, finely punctate-striate, intervals with erect hairs, thickly placed in rows.—Pennsylvania.

X. retusicollis Zimm.—Long. 1 lin. Ferruginous yellow; front smooth, with a deep longitudinal impression; prothorax longer than wide, a little broader than the elytra, punctured in front, thinly pubescent, and very deeply excavated; the front margin rising into an acute point; behind nearly glabrous and smooth. Elytra short, punctured without order, thinly pubescent, obliquely declivous behind, and somewhat impressed along the suture.—Maryland. Found under oak-bark.

C.—Middle and hind tibiæ triangular, acutely toothed on the outer edge, as in the genuine *Bostrychi*.

X. [*cælatus* Eichhoff, Berlin Entomologische Zeitschrift, 1867, p. 402].—Long. 1½ lin. Brown, ferruginous, and sometimes blackish, antennæ and feet ferruginous; very similar to the genuine *Bostrychi*, cylindrical, thinly pubescent; prothorax in front roughly tuberculate, thickly punctured behind, except a narrow smooth longitudinal line; elytra coarsely punctate-striate, the sutural stria deeper, marked with transverse punctures, intervals with smaller distant punctures; obliquely declivous behind, on account of the slightly elevated and feebly toothed side margin the declivity is somewhat concave; the suture is elevated, and each side of it are seen three elevated teeth, which stand near the side margin, but do not form parts of it; the marginal teeth are smaller, and often scarcely visible.—Atlantic States. Very abundant on pines.

BOSTRYCHUS Fabr.

The name *Bostrichus* (more properly *Bostrychus*) was first applied by Geoffroy to *Apatæ capucina*. Fabricius applied it to all the insects belonging to the tribe here under consideration, probably because the meaning of the name appeared to him more applicable to them than to *Apatæ*. Latreille adopted the nomenclature of Geoffroy, and therefore proposed for the *Bostrychi* the name *Tomicus*, which has since been commonly adopted. More recently Erichson has divided this genus into many subgenera, of which those above defined (*Crypturgus*, *Xyleborus* and the present) can be regarded as well defined groups.

The body in the species of the present subgenus is short cylindrical; the prothorax is longer than wide, convex, roughly tuberculate in front; the elytra are obliquely suddenly declivous behind, and excavated, with the elevated margin toothed, while in the two preceding subgenera the posterior declivity of the elytra is formed in a different manner. The females differ from the males in the form of the prothorax, which in the former is somewhat longer and narrower in front. The species live mostly under the bark of coniferous trees; they appear sometimes in countless multitudes, and do immense mischief by killing the trees in the forests of pine and fir; as was the case with *B. pini* in Caro-

lina in 1847—49, and with *B. stenographus* and *typographus* in Germany frequently since 1665.

B. [avulsus] Eichh. Berl. Ent. Zeitschr. 1867, 402.]—Long. $1\frac{1}{4}$ lin. Of the same form color and sculpture as *B. pini*, but much smaller, and easily distinguished by the posterior excavation of the elytra, the side margin of which is armed with but a few (three) small teeth; it is also less hairy, and the hinder part of the suture appears altogether without hair.—Carolina.

B. pini Say, Journ. Ac. Nat. Sc. Phila. v, 257.—Long. $1\frac{1}{2}$ — $1\frac{3}{4}$ lin. Brown or ferruginous; antennæ yellow; form as in *B. exesus*, but much smaller, and comparatively longer and narrower; the rows of punctures of the elytra are finer, and the punctures not transverse, with the exception of those of the first stria; the first five intervals are entirely smooth in front; the posterior excavation acutely margined with five lateral teeth, of which the uppermost is the smallest, and the middle one the largest, the suture is somewhat elevated and distinctly hairy.—North America. [This species is not that described by Say, but an allied one, which I have named *cucographus*.—Lec.]

B. exesus Say, Journ. Ac. Nat. Sc. v, 255.—Long. 2— $2\frac{1}{2}$ lin. Blackish, brown, or ferruginous, antennæ yellow; upper surface at the sides thickly punctured and fringed with long yellow hair; head and prothorax roughly tuberculate, the latter finely punctured and shining behind; elytra punctate-striate, the punctures large and transverse; the upper intervals also marked with a few punctures; posterior excavation deep, strongly margined, and armed with six teeth, of which the 2nd and 3rd are the largest; the narrow part of the margin between the 6th tooth, and the suture has the appearance of a 7th tooth.—North America. This species is very similar to the European *B. stenographus* Creutzer (= *typographus* Fabr.), but differs by the much more finely punctured hind part of the prothorax and by the posterior excavation of the elytra, which is more rugosely punctured, and hairy.

Tribe III.—HYLURGI.

The third joint of the tarsi is more or less dilated and bilobed, in which respect the insects of this tribe differ from those of the preceding; the cylindrical convex abdomen separates them from *Eccoptogasteres*. *

The genera may be separated as follows:

* Basal margin of the elytra acutely elevated and serrate:

1. Club of antennæ composed of lamellæ..... *Phlæotribus* Latr.
2. Club of antennæ composed of closely united joints, knob shaped; the subgenera are as follows:

a. Club of antennæ elongate oval, or spindle shaped, pointed at tip.

Hylesinus Fabr.

b. Club of antennæ short and obtuse, sometimes thick and almost globose, sometimes compressed, and concave..... *Dendroctonus* Erich.

** Basal margin of elytra not acutely elevated:

3. Club of antennæ short and thick, knob shaped, composed of closely united joints..... *Hylurgus* Latr.

* None of the 2nd tribe are described in the memoir of Dr. Zimmermann; the species of my collection will be made known in the appendix.—Lec.]

PHLÆOTRIBUS Latr.

The antennæ are inserted upon the front, before the eyes; the club consists of elongated lamelliform joints, almost like that of a *Melolontha*, otherwise the body is formed exactly as in *Hylesinus*.

P. frontalis.—*Scolytus front.* Oliv. 78, 13, Tab. 2, f. 20. [*P. setulosus* Eichh. Berl. Ent. Zeitschr. 1868, p. 149; *P. dubius* Eichh. ibid. 150.]—Long. $\frac{3}{4}$ —1 lin. Brown, antennæ and feet ferruginous; of the form of the European *P. oleæ*, but the joints of the antennal club are much shorter, the elytra deeply grooved, and the intervals are transversely serrate; the whole body is clothed with short stiff hairs. In the male the front is impressed, and marked each side below the base of the antennæ with a small tooth.—Atlantic States. Found in the bark of old stumps of trees, in the swamps of Carolina, in March. [Closely allied but different by the finer punctuation of the prothorax is *Tomicus liminaris* Harris, (Ins. Inj. Veg. ed Inda. 88,) which occasions according to Miss Morris, the disease in peach trees called yellows. The lamellate joints of the club of the antennæ are much longer and thinner than in *P. frontalis*.—Lec.]

HYLESINUS Fabr.

The elongated pointed antennal club and the short thick oval body easily distinguish this from the following genus.

H. aculeatus Say, Journ. Ac. Nat. Sc. Phila. III, 322.—Long. 1—1 $\frac{1}{4}$ lin. Of the same form as the European *H. fraxini* but smaller; blackish-brown, thickly clothed with very short ashy squamiform hairs; antennæ and feet ferruginous; a large spot on the middle of the prothorax and the side margins are blackish brown: upon the elytra the 5th interval from the base to the middle is blackish-brown, the color is then divided into two branches, and prolonged obliquely to the suture; the humeri are ferruginous; the rows of small acute elevations on the intervals of the elytra have suggested the name of this species.—Northern States. [In well preserved specimens besides the two oblique bands behind the middle there is a third one very near the tip, and the sides of the elytra are also dark colored.—Lec.]

DENDROCTONUS Erichson.

The species of this genus differ from those of *Phlæotribus* and *Hylesinus* by the short obtuse antennal club. They may be divided into three groups:

A.—Antennal club thick; beak not carinate.

D. [bifurcus.]—*Carpoborus bif.* Eichh. Berl. Ent. Zeitschr. 1868, p. 147.]—Long. $\frac{3}{4}$ lin. Black, elytra brown, the whole body covered with fine ashy scales like hairs, without lustre; antennæ and feet ferruginous yellow; beak very short, front convex; prothorax convex, shorter than wide, apical margin rounded, very finely granulately punctured, with a faint smooth dorsal line; elytra cylindrical, moderately slender, strongly punctate-striate, the 3rd interval strongly elevated towards the tip.—Carolina. [Also found in Georgia.—Lec.]

B.—Antennal club thick; beak carinate. (No American species.)

C.—Antennal club short with outer joints compressed, and concave.

D. terebrans.—*Scolytus terebrans* Oliv. 78, 6; tab. 1, f. 6.—Long. $2\frac{1}{2}$ — $3\frac{1}{2}$ lin. The color varies, from ferruginous yellow, though all shades of brown, to black, but the club of the antennæ and the tarsi are always ferruginous, and the whole body is clothed with yellow hairs; front roughly granulated; beak emarginate at tip in the middle, and marked with two tubercles; prothorax shorter than wide, narrowed in front, apical margin emarginate, thickly punctured on the disk, sides roughly granulate; elytra short cylindrical, rounded behind, striate, striæ and intervals punctured and granulated; tibiæ broad with large marginal teeth.—Atlantic States.

D. frontalis.—*Bostrichus frontalis* Fabr. Syst. El. II, 389.—Long. $1\frac{1}{2}$ lin. Brown, head broad, punctured deeply channelled, and marked with two frontal tubercles; prothorax broader than long, almost cylindrical, finely punctured, slightly constricted in front, apical margin feebly emarginate; elytra emarginate, behind obtusely rounded, strongly striate, intervals thickly and finely granulate-punctured.—Carolina.

HYLURGUS Latr.

These insects differ from those of the allied genus *Dendroctonus* by the more slender body, by the basal margin of the elytra being neither acutely elevated nor serrate, and by the more distinctly developed beak. The color is black, and only in freshly hatched individuals brown or ferruginous; but the antennæ, tarsi, extremity of the tibiæ and the front margin of the prothorax are generally ferruginous or brown. The species are distinguished chiefly by the form of the prothorax and the sculpture of the elytra.

A.—Beak distinctly carinated.

H. scabripennis Zimm.—Long. 2— $2\frac{1}{2}$ lin. As long as the European *H. ater* but broader; upper surface glabrous; prothorax a little longer than wide, narrower in front, shining, tolerably sparsely punctured, the punctures thicker and finer in front than behind; elytra very deeply striate, the striæ are less evidently punctured, but the intervals are very deeply rugose.—Atlantic States. [This species is perhaps *H. carbonarius* Fitch, Noxious Insects of New York, 4th Report, No. 249, and is certainly *H. porculus* Er. Wiegmann's Archiv. 1836, i, 49; the rostral carina is very indistinct in several of the specimens in my collection.—Lec.]

H. cavernosus Zimm.—Long. 2— $2\frac{1}{2}$ lin. Very similar to the preceding, and of the same size, form and color, but the thorax is longer, more deeply punctured, and marked with a distinct smooth dorsal line; elytra punctate-striate, the punctures very deep and distinct, the intervals narrow, less deeply rugose. Atlantic States.

B.—Beak not carinated.

H. tenuis. [= *Hylastes tenuis* Eichh. Berl. Ent. Zeitschr. 1868, 147.]—Long. 1— $1\frac{1}{2}$ lin. Slender, dull black, tolerably thickly clothed with short yellow hairs; prothorax longer than wide, thickly punctured, with a smooth slightly elevated dorsal line; elytra with broad flat striæ thickly set with transverse punctures, intervals very narrow and elevated.—Atlantic States.

APPENDIX.

BY JOHN L. LE CONTE, M. D.

For some years past there has been a growing tendency, especially in the Western States, where agricultural interests dominate, to the study of economic entomology. Unfortunately the efforts of industrious and meritorious observers are, in some instances, thwarted, or rendered of but little value, because the want of systematic knowledge regarding the characters and consequently the proper nomenclature of the noxious objects has not yet been supplied by those who devote themselves specially to the study of the differences in structure of these minute insects.

With a view to remedy in some degree this want, as far as regards the SCOLYTIDÆ, among whom may be ranked some of the most formidable enemies of arboriculture, I have thought that descriptions of the species in my collection, which are not contained in the foregoing memoir, might not be unacceptable in the present condition of agricultural science.

The students familiar with the most recent works on entomology published abroad, will at once perceive that the classification of our author is much more elementary in its nature than those now generally adopted. Disregarding the number of small joints of the antennæ composing the funiculus, between the club and the scape or elongated first joint, his system depends to a great extent on the form and structure of the club, the portion of the organ adapted for special sensibility.

The value of the number of these joints, varying from 1 to 7, often very small, frequently very difficult to observe, seems to me to have been greatly exaggerated by some modern systematists; while admitting their usefulness in defining groups of species within the genera, I am not disposed to introduce them into the generic formulæ, except as accessory to more important differences in form and structure.

Tribe I.—PLATYPINI.

The admirable monograph of Dr. Chapuis upon this tribe, so distinct from the other two as almost to warrant its being viewed as a subfamily, obviates the necessity of any extended remarks upon the few species belonging to our fauna. The following references to the work will enable the student to identify the species, all of which belong to the genus *Platypus*, without trouble.

1. *P. flavicornis* Chapuis, 154.=*Bostrichus flav.* Fabr. &c.
2. *P. compositus* Say. Chapuis, 163.
3. *P. tremiferus* Chapuis, 174.
4. *P. perfossus* Chapuis, 176.
5. *P. rugosus* Chapuis, 176.
6. *P. Blanchardi* Chapuis, 185.
7. *P. punctulatus* Chapuis, 199.
8. *P. disciporus* Chapuis, 219.
9. *P. quadridentatus* Lec. in Chapuis, 338.=*Scolytus 4-dent.* Oliv.

I may add to the brief description of this last named species which I wrote to Dr. Chapuis, that it approaches to, and is perhaps identical with his *P. Blanchardi*; by an unfortunate clerical or typographical error the two acute tubercles or spines of the abdomen are stated to be on the 3d instead of the 4th ventral segment. The terminal process of the elytra is truncate, with rounded angles in one specimen, and on one side of a second, which is before me, while on the other side of the latter the two cusps mentioned in the description of *P. Blanchardi* may be seen. I infer, therefore, that they disappear with age.

Dr. Zimmermann observes of these insects, that they "are found "mostly in pine logs; they remain commonly about the foot of the "tree, where they make their dwellings; their presence is easily known "by the large heaps of worm-dust, (wurmmehl,) which they, by moving "backwards, push out of their galleries. In South Carolina, where "they occur abundantly, they also fly to the light in houses, on dark "evenings, from March to October."

Tribe II.—TOMICINI.

The occurrence in our fauna of several genera not represented in the Zimmermann collection, renders necessary a tabular statement of their affinities, which may be thus expressed:

- A. Head not completely covered by the prothorax, partly visible from above; prothorax not tuberculate in front.
 - Club large, flat, not annulated; funiculus 2-jointed.....**Cryptargus.**
 - Club smaller, oval, annulated; funiculus 3-jointed.....**Aphanarthrum.**
- B. Head completely overhung by the prothorax, which is very convex and tuberculate in front.
 - a. Club of antennæ large, much compressed, transversely annulated on both surfaces; funiculus 1—5-jointed.....**Cryphalus.**
 - b. Club of antennæ large, rounded, entirely corneous on one side, circularly annulate on the other, or solid.
 - Eyes divided, club solid.....**Xyloterus.**
 - Eyes emarginate, club annulated.....**Xyleborus.**
 - c. Club of antennæ entirely corneous on one side, transversely annulated on the other, the sutures being undulated.
 - Elytra deeply excavated at tip, with the margin of the excavation strongly toothed.....**Tomicus.**

- d. Club of antennæ pubescent, with the exception of an elongated space extending from the base to the middle; sutures loop-shaped, parallel with the smooth space **Micracis.**

With the exception of *Cryphalus* (including *Corthylus* and *Corthylomimus*), which is polymorphic, these genera are readily distinguished by a form and sculpture peculiar to each.

CRYPTURGUS Er.

C. atomus.—Slender, cylindrical, shining black, antennæ and legs brown, slightly hairy on the head and at the sides of the thorax, and with rows of hairs upon the elytra; prothorax longer than wide, scarcely narrowed in front, slightly rounded on the sides, more rounded at the base and tip, uniformly sparsely but strongly punctured; elytra with rows of large punctures, the sutural one impressed towards the base; intervals with scarcely perceptible rows of very small punctures. Long. 1 mm.

New York, Mr. Ulke. The smallest of our Scolytidæ. The club of the antennæ is tolerably large, strongly compressed, oval, obliquely narrowed on the outer half, corneous, shining, and but slightly pubescent except on the oblique edges; the funiculus consists of but two small joints, the 2nd being much smaller than the first. The posterior declivity of the elytra is convex, without impressions.

APHANARTHURUM Wollaston.

To this genus heretofore known only from the Madera and Canary Islands, I would refer *Hylastes pumilus* Mann., from Alaska. It is scarcely over 1.5 mm. long, slender, cylindrical, dark brown, shining, very thinly clothed with a very short pubescence, forming lines upon the elytra; the prothorax is longer than wide, much narrowed in front of the middle, rounded on the sides, strongly rounded at tip, very feebly rounded at base, moderately convex, strongly and tolerably thickly punctured; elytra with striæ of very large punctures, of which the 1st and 2nd are somewhat impressed, intervals with scarcely perceptible rows of very small punctures.

This insect has nearly the form of the preceding, but under a powerful magnifier the club of the antennæ is seen to be oval, not very much compressed, with the basal half corneous and shining, the outer half conical, annulated and pubescent; the funiculus is composed of three distinct joints, the 1st being the largest, and the 3rd the broadest, oblique and narrower at the inner side. The tarsi are very slightly dilated, the 3rd joint very feebly emarginate, thus establishing a relationship to the next tribe.

The head is however short as in *Crypturgus* and somewhat prominent, though not at all rostrated as in *Hylurgini*.

This species has been made by Eichhoff, (*Berl. Ent. Zeitsch.* 1868, p. 147), the type of a new genus *Dolurgus*; the funiculus is described as 4-jointed, but after repeated examination, I am unable to perceive more than three joints the proportions of which I have endeavored to describe above.

CRYPHALUS Er.

I have combined under this name all those species which have the club of the antennæ large, compressed, and transversely annulated on both surfaces. It consequently corresponds to Dr. Zimmermann's genus *Crypturgus* which name cannot be retained for it as the typical European species, unknown to our author, is of a quite distinct type.

With the enlarged definition of *Cryphalus* adopted by me, it will contain species of varied form, and differing in the number of joints of the funiculus of the antennæ: the funiculus is however always short, and the joints, after the first, closely connected both with each other and with the base of the club. The species are numerous and may be grouped as follows:

A.—Funiculus 1-jointed (base of club not articulated).

This group corresponds with *Corthylus* Er., and may be divided into two subgroups: I, *Corthylomimus* Ferrari, corresponding with the first division of Dr. Zimmermann's *Crypturgus*, having the club of the antennæ fringed, and the outer surface of the front tibiæ transversely corrugated. II, *Corthylus* proper, with the club still larger, not fringed, and the front tibiæ armed at the outer edge with a few small teeth.

To the first subgroup belong the following species:

* Posterior declivity of elytra flattened, feebly margined behind:

1. *C. fasciatus*. (Ante, p. 143.)

2. *C. scutellaris* Lec. Report R. R. Expl. to Pacific, xi. Insects, 59. California.

** Posterior declivity of elytra concave, acutely margined behind:

3. *C. cavus*.—Black, moderately shining, elytra brown, darker towards the tips, antennæ yellowish, feet brown; head convex, strongly not densely punctured; prothorax finely roughened near the tip, nearly smooth behind, about one-third longer than wide, parallel on the sides, obtusely rounded in front; elytra very finely punctulate and rugose, posterior declivity deeply excavated and hairy, with its margin strongly elevated for more than one-half the extent, ending in an acute cusp, above which, continuing the outline of the declivity and nearer the suture are three other small denticulations; the suture along the declivity is elevated. Long. 3.5 mm.

One specimen of this very distinct species was given me by Dr. G. H. Horn, as collected in the coast region of California, south of San Francisco.

*** Posterior declivity of elytra with subsutural tubercles :

4. *C. dentiger*.—Slender cylindrical, not very shining, nearly glabrous, dark brown, posterior half of prothorax, antennæ and feet brownish-yellow: head flat, opaque, finely punctured; prothorax nearly one-half longer than wide, parallel on the sides, obtusely rounded in front, finely roughened in front of the middle, nearly smooth behind; elytra very indistinctly and sparsely punctulate, posterior declivity slightly concave, elevated margin acute below, then rising into a small acute cusp, then becoming thick and retuse for a short distance, then armed near the suture with another small acute cusp or small spine; the suture is not elevated, and near it on each side, about the 2nd third of the declivity is a small rounded subacute tubercle. Long. 2 mm.

One specimen from middle California given me by Dr. Horn. This species is of the same size and form as *C. mali*, but differs in the posterior declivity of the elytra, as above described, being concave and broadly retuse at its lateral margin.

5. *C. mali*. (Ante, p. 143.)

To the 2nd subgroup, or *Corthylus* proper, belongs only

6. *C. punctatissimus* Zimm. (Ante, p. 144.)

B.—Funiculus of antennæ 2-jointed, body stout, head large, prominent, and deflexed.

But one species of this group is known to me:

7. *C. dissimilis* Zimm. (Ante, p. 144.)

This differs remarkably from the others in form, and resembles somewhat the figure of *Hypothonemus* in DuVal, *Gen. Col. Eur.* iv, pl. 33, fig. 161, but is stouter.

C.—Funiculus of antennæ 4 or 5-jointed, (except in No. 16,) outer joints closely connected with each other, forming a pedicel to the club.

Several subgroups may be recognised, and the species tabulated for convenient reference as follows:

* Club of antennæ feebly annulated, more shining; elytra shining, scarcely punctured:

Posterior declivity of elytra strongly retuse..... 8. *retusus*.

Posterior declivity of elytra feebly retuse..... 9. *sulcatus*.

Posterior declivity of elytra not retuse:

Thorax moderately rough in front10. *materiarius*.

Thorax very rough in front, (very small).....11. *asperulus*.

** Club of antennæ distinctly annulated, less shining, sutures transverse nearly straight:

a. Elytra finely punctulate and pubescent:

Pubescence of elytra short and fine.....12. *minutissimus*.

Pubescence of elytra longer and coarser.....13. *pubipennis*.

Pubescence of elytra sparse and body more slender..14. *pilosus*.

b. Elytra with rows of quadrate punctures, posterior declivity not sulcate.

Elytra with rows of short stiff bristles15. *hispidulus*.

Elytra with rows of short very fine hairs.....16. *striatus*.

- c. Elytra with more or less distinct rows of punctures, posterior declivity broadly sulcate near the suture:

Thorax finely punctulate behind, with a large patch of hair each side in front of the middle17. *comatus*.

Thorax coarsely punctured behind, without patches of hair.—*TETROPHLEUS* Fairmaire.

Subsutural groove of declivity broad and deep:

Elytra coarsely punctured in rows18. *pullus*.

Elytra coarsely punctured, but not in rows.....19. *pulicarius*.

Elytra more finely punctured in rows:

Prothorax regularly rounded in front.....20. *atratus*.

Prothorax slightly constricted near the tip.21. *nitidulus*.

Subsutural groove of declivity very faint:

Elytra more finely and confusedly punctured. 22. *puberulus*.

8. *C. retusus*.—Cylindrical, slender, blackish-brown, base of elytra paler, antennæ and feet yellowish; head prominent, convex, subcarinated, shining, sparsely punctured; prothorax nearly one-half longer than wide, sides slightly converging from the base and feebly rounded, tip strongly rounded, surface rough and sparsely hairy before the middle, granules tolerably coarse near the tip, behind the middle sparsely punctulate; elytra very finely rugose and distantly punctulate in rows, and with a few long hairs behind the middle, posterior declivity with a deep depression along the suture, limited each side by a longitudinal obtuse elevation, bearing on its highest portion a few very fine denticulations; suture not elevated. Long. 3.5 mm.

Collected in the coast region of California and Oregon by Dr. Horn. This species has the same form and sculpture as *C. materiarius*, but is larger and readily distinguished by the different sculpture of the posterior declivity of the elytra.

9. *C. sulcatus*.—Form, size and sculpture precisely the same as in *C. retusus*, except that the front is divergently aciculate, and the occiput is sparsely punctured; the elytra are similarly punctulate in rows, but the general surface is more distinctly and densely rugose; the retuse elevation of the posterior declivity of the elytra is but slightly prominent, and not denticulate; the hairs behind the middle of the elytra are less numerous. Long. 3.5 mm.

One specimen from the coast region of middle California, given me by Dr. Horn. The color is paler than that of the three specimens of *C. retusus* now before me, being yellowish-brown, with the base of the thorax, and the sides and tip of the elytra darker. Probably more mature specimens would be darker; it is perhaps the female of the preceding, but having failed to find any sexual characters in *C. materiarius*, I am not warranted at present in so regarding it.

11. *C. asperulus*.—Slender, cylindrical, brownish-black, shining, nearly glabrous, antennæ and feet yellow; head flat, feebly punctulate; prothorax one-half longer than wide, feebly narrowed and rounded on the sides from the base, strongly rounded at tip, very rough and slightly pubescent before the middle, but almost entirely smooth behind; elytra scarcely punctulate, posterior declivity with a few hairs, almost uniformly convex, with a very feeble subsutural furrow. Long. 1.5 mm.

One specimen from Virginia, given me by Mr. E. T. Cresson. With the exception of *C. hispidulus*, *puberulus* and *Crypturgus atomus*, this is the smallest native Scolytide known to me. The elytra under a high magnifying power show some very faint rows of small punctures.

13. *C. pubipennis*.—*Tomicus pubip.* Lec. R. R. Expl. to Pacific, xi, Ins. 59. California.

14. *C. pilosulus*.—Elongate, cylindrical, yellow ferruginous, shining, front hairy; prothorax longer than wide, finely asperate in front, tolerably densely punctured behind, uniformly clothed with fine pubescence; elytra tolerably densely and finely punctured, and clothed with fine erect hairs, without any appearance of striæ, obliquely declivous and slightly flattened behind. Long. 2 mm.

I found one specimen of this species in middle California; others were collected by Dr. Horn in the southwestern part of the State.

15. *C. hispidulus*.—Moderately elongate, black, scape and first joint of funiculus of antennæ, tibiæ and tarsi ferruginous; head prominent convex, finely reticulate; prothorax not longer than wide, convex, before the middle rough with acute reclinate tubercles, rugosely punctured behind, clothed with short stiff hairs; elytra with approximate rows of quadrate punctures, intervals narrow, with rows of close set short stiff erect gray bristles; posterior declivity rounded, not at all flattened. Long. 1—1.5 mm.

District of Columbia, Georgia, Louisiana; this species, though evidently related to *C. dissimilis*, has the outer portion of the funiculus, or rather the pedicel of the club of the antennæ, slender and divided by very fine transverse sutures, the base of the club is shining and smooth.

16. *C. striatus*.—Elongate cylindrical, dark brown, antennæ and feet yellow; head prominent, convex, punctured, slightly pubescent, with a smooth transverse frontal elevation; prothorax longer than wide, convex, finely roughened in front, with a few larger tubercles, which are somewhat acute, tolerably densely and coarsely punctured behind, sparsely clothed with short hairs; elytra with approximate rows of large quadrate punctures, intervals each with a series of very fine punctures bearing short yellowish hairs; tip obliquely declivous, very slightly flattened. Long. 2 mm.

This species is widely distributed. I have several specimens collected at Cape San Lucas, Lower California, by Mr. John Xántus, others were found in Middle California by Dr. Horn, and I have seen two in the collection of the American Entomological Society which came from Illinois. The club of the antennæ is very distinctly annulated, the outer part of the funiculus is divided by one transverse suture, visible only under a compound microscope; it is therefore only 3-jointed; the first joint is larger than the other two united.

20. *C. atratulus*.—Elongate cylindrical, black, antennæ and feet very dark brown; front clothed with long hair; prothorax longer than wide, sides nearly straight and parallel, disc rough with elevated tubercles in front, strongly but

not densely punctured behind, with a broad, smooth dorsal line; elytra with rows of moderately fine close set punctures, here and there somewhat irregular, intervals broad flat, the alternate ones with a few distant punctures; tip obliquely declivous, broadly and deeply sulcate along the suture, and with a few erect hairs. Long. 2 mm.

Two specimens, Cabo de los Reyes, California, Mr. George Davidson. Related to *C. pullus*, but with the elytra punctured as in *C. nitidulus*, from which it differs chiefly by the form of the thorax, which is more parallel on the sides, and not at all constricted, but regularly rounded near the tip.

21. *C. nitidulus*.—*Bostrichus nitid.* Mannh. Bull. Mosc. 1843, 298; 1846, 359.

Sitka. This species resembles *C. pullus* Zimm., but differs by the punctures of the rows of the elytra being much finer and more closely placed, and the intervals therefore wider and more even; the prothorax is also distinctly rounded on the sides, and slightly constricted near the tips.

22. *C. puberulus*.—Cylindrical, moderately slender, black, thinly clothed with short erect gray hairs; head slightly convex, punctulate; prothorax a little longer than wide, slightly narrowed in front, feebly rounded on the sides, broadly rounded at base, and more strongly at tip, disé rough, with reclinate tubercles in front of the middle, strongly but finely punctured at the sides and behind; elytra about one-half longer than the prothorax, strongly but finely punctured, but not in rows, posterior declivity not at all flattened, slightly convex, with a well marked sutural stria extending from the tip one-third the length of the elytra, tip of suture slightly acute, (but not acuminate, as in *Micracis*.) Long. less than 1.5 mm.

One specimen from District of Columbia given me by Mr. Ulke. This is among our smallest species, and somewhat resembles *C. minutissimus* Zimm. in form, but is smaller and much less finely punctured, and is narrower. It is easily distinguished by the absence of the fringe of long hairs on the head, and by the well marked, though narrow sutural stria extending from behind the middle to the tip of the elytra; the acuteness of the sutural angle induces me to believe that this is perhaps *Tomicus pusillus*, Fitch, Noxious Ins. New York, ii, No. 245.

The funiculus of the antennæ in this species is 5-jointed, the outer joints 2—5 being closely connected, forming a pedicel to the club, as in the group *Trypophlæus* Fairmaire, DuVal, Col. Europe, iv. pl 33, fig. 160; in the proportions of the body and in sculpture our species also resembles the figure cited. A similar structure of the funiculus is seen in *C. nitidulus*, *atratus*, *pullus* and *pulicarius*. *C. comatus*, so anomalous by the two tufts of hair on the prothorax, seems to belong rather to the typical *Cryphalus*; at least, so far as the condition

of the specimen permits an examination, the funiculus appears to be 4-jointed.

XYLOTERUS Er.

In this genus the club of the antennæ is large, pubescent, oval, solid and not at all annulated, with a somewhat smooth elongate spot extending from the base to the middle; the funiculus is 4-jointed, and the eyes are so deeply emarginate as to become completely divided.

No species of this genus is contained in the collection of Dr. Zimmermann, and the name was applied by him to some species not separated by Erichson from *Tomicus*, but which now form the genus *Xyleborus* Eichh.; I have taken the liberty of substituting the latter name in his MSS.

Mr. A. Puton* observes that the European species of this genus do not make their galleries between the inner bark and the wood, as is the case with nearly all the insects of this family, but burrow deeply into the wood itself, thus greatly injuring the value of the trees which they attack. Our species, without doubt, will be found to have similar habits.

1. *X. retusus*.—Cylindrical, rather stout, blackish brown, shining; head (♂) deeply concave, sparsely finely punctured, clothed with erect hairs; prothorax much broader than long, rather quadrate in form, being as broadly rounded at tip as at base, convex, very strongly declivous and broadly impressed near the tip; asperate with transverse granulations, and clothed with long erect hair in front, finely, not densely punctured behind; elytra with distant rows of rather fine and not deeply impressed punctures, each with a testaceous vitta abbreviated before and behind. Long. 4.5 mm.

One specimen from Canada given me by Dr. Horn. Resembles the next, but is much larger, easily distinguished by the form of the thorax, which is more abruptly declivous in front, and broadly retuse.

2. *X. bivittatus* Mannh. Bull. Mosc. 1853, 236. = *Apate biv.* Kirby, Fauna Bor. Am. iv, 192, tab. 8, fig. 5: (♂) *Bostrichus cavifrons* Mannh. Bull. Mosc. 1843, 297; *ibid*, 1852, 359: = *Xyloterus cav.* Mannh. *ibid*, 1852, 385.

Maine to Alaska. In the male the head is concave, and the thorax finely transversely asperate before the middle; in the female, the head is convex, and the thorax much more roughly asperate. This species varies greatly in color, the black elytral vittæ sometimes occupy nearly the whole surface, and sometimes are almost wanting.

3. *X. scabricollis*.

I have received from Mr. Ulke a remarkable male, having the head deeply concave, as usual, but the thorax is as rough in front as in the

* *Ann. Soc. Ent. France*, 1867, p. 634.

♀ of *X. bivittatus*, and covered behind with anastomosing curved lines, leaving between them flattened granules; the elytra are shining, and the punctures of the rows are larger and more strongly impressed; the color is uniform reddish brown, with the antennæ and feet paler. Long. 3.5 mm. Washington, D. C.

4. *X. politus* Lec. Entom. Writings of Thos. Say, ii, 319.—*Bostrichus politus* Say, Journ. Acad. Nat. Sc. Phila. v. 256; ed. Lec. ii, 318.

Middle and Southern States. Narrower than the other species, more hairy, and easily known by the punctures of the elytral rows being larger and more distant; the club of the antennæ is broader and less oval. I have seen no specimens with concave head.

XYLEBORUS Eichhoff.

These species have the eyes slightly emarginate; the outer (or posterior) face of the antennal club is corneous and shining, the inner face equally so, except at the end, where there is an oval pubescent circularly annulated space; the outline viewed from the outer face appears truncate, and sometimes almost obtusely pointed at the side.

In all the species known to me, the first joint of the funiculus of the antennæ is longer and thicker, equal in length to the others united, which, varying in number from three to four, are closely joined, forming a conical mass, the separations of which are visible only with a very high magnifying power. They may be grouped as follows:

A.—Body stout cylindrical, thorax not longer than wide, funiculus of antennæ 4-jointed.

1. *X. tachygraphus*.—*Xyleborus tachygr.* Zimm. (Ante, p. 144.)

2. *X. pyri*.—*Scolytus pyri* Harris. (Ante, p. 144.)

3. *X. obesus*.—Short and stout, cylindrical, blackish-brown, thinly clothed with long soft erect pale hairs, antennæ reddish-brown; head convex, coarsely but not densely punctured; prothorax rather broader than long, strongly roughened with subacute tubercles in front, nearly smooth behind; elytra with rows of large punctures, not very closely set, intervals flat marked with small distant punctures from which proceed the long hairs; tip obliquely declivous, not tuberculate, but with the striæ somewhat impressed, and the side and tip acutely margined, as in the two preceding species. Long. 3 mm.

Virginia, Massachusetts and Canada. Differs from the two preceding by its much stouter form and by the absence of the small acute tubercles of the declivous tip of the elytra.

B.—Body usually slender cylindrical, posterior declivity of elytra obliquely and strongly flattened, with rows of tubercles or teeth; funiculus of antennæ 5-jointed—XYLEBORUS Eichhoff.

a.—Tibiæ finely serrate.

4. *X. celsus* Eichh. Berl. Ent. Zeitschr. 1867, 400. (Ante, p. 145.)

5. *X. biographus*.—Cylindrical, not very slender, chestnut-brown, antennæ and feet paler, shining, thinly clothed with very long hairs; head sparsely punctured, prothorax (§) longer than wide, broadly and deeply excavated before the middle, and covered with flat granules, producing an imbricated appearance, anterior margin obtusely angulated; the surface at the sides is sparsely punctured, and near the middle of the base is almost smooth; elytra less than twice as long as the prothorax, with rows of large feebly impressed punctures, posterior declivity flat, impunctured, with three acute tubercles each side equally distant from the suture and the margin of the declivity, which is marked with a second row of three or four smaller teeth, and outside of these again are two or three scarcely perceptible denticles. Long. 3 mm.

One male from Illinois is before me. This species seems to be the analogue of the European *X. monographus*, the male of which has the thorax similarly impressed and retuse. It is also related to *X. retusicollis* Zimm., but differs by its larger size, less prominent tubercles of the apical declivity of the elytra, as well as by minor differences in sculpture.

6. *X. retusicollis* Zimm. (Ante, p. 146.)

7. *X. fuscatus* Eichh. Berl. Ent. Zeitschr. 1867, 400. (Ante, p. 145.)

8. *X. impressus* Eichh. Berl. Ent. Zeitschr. 1867, 400.—Georgia.

9. *X. xylographus*.—*Bostrichus zylogr.* Say; *X. pini* Eichh. Berl. Ent. Zeitschr. 1867, 401. (Ante, p. 145.)

10. *X. pubescens* Zimm. (Ante, p. 145.)

11. *X. planicollis* Zimm. (Ante, p. 145.)

b.—Tibiæ coarsely serrate.

12. *X. cælatus*.—*Tomicus cælatus* Eichh. Berl. Ent. Zeitschr. 1867, 402. (Ante, p. 146.)

The circularly annulate portion of the club of the antennæ is larger than in the other species, (except *X. sparsus* and *plagiatus*,) and the smooth basal part correspondingly smaller, showing therefore the same tendency towards *Tomicus* mentioned below.

c.—Tibiæ with only a few small teeth, anterior pair narrower than the others.

13. *X. sparsus*.—Elongate cylindrical, blackish-brown, shining, sparsely clothed with very long erect hairs; antennæ and feet dark ferruginous; head densely pilose, with long yellow hair, prothorax a little longer than wide, coarsely asperate in front, coarsely and sparsely punctured behind, with an elongated, smooth dorsal space; anterior margin fringed with hairs which are half as long as the thorax; elytra with rows of distant coarse punctures, intervals with more distant but equally coarse punctures, so that at first sight the punctuation appears confused; tip obliquely declivous, impunctured, except in the subsutural furrow, which is well marked, face of the declivity each side with two large acute tubercles, and a third smaller one at the upper edge of the slope, margin of the slope with a few (three or four) small denticles; extreme tip slightly produced into an acute point. Long. 2 mm.

One specimen from Point Kewenaw, Lake Superior. The tibiæ in

this species are less dilated and less distinctly serrate than in those above mentioned.

14. *X. plagiatus*.—Less slender, ferruginous brown, shining, thinly clothed with long erect hairs; antennæ and legs paler; head convex, punctured, with a triangular, opaque, pubescent, frontal spot; prothorax scarcely longer than wide, sides parallel behind, then semicircularly rounded with the apex; base very distinctly rounded towards the sides, surface strongly roughened before the middle, finely but deeply punctured behind, with a smooth oval space each side just behind the middle; elytra strongly but not densely punctured, punctures not arranged in rows; posterior declivity strongly toothed (♂), or almost unarmed (♀) scarcely punctured, suture elevated. Long. 2 mm.

Male with the posterior declivity of the elytra deeply concave, with the margin semicircularly elevated from near the tip to near the suture, armed at its upper limit with a robust horn, slightly hooked at the tip, then with two or three denticles, and ending below in a rather prominent tooth.

Female with the posterior declivity somewhat retuse each side, and deeply sulcate near the suture, with a very small denticle near the suture, and a larger subacute tubercle near the tip.

Maryland, Mr. H. Ulke. I infer that these two forms are the sexes of the same species, on account of the identity in sculpture of the thorax, and because the sexes of the European *Tomicus bidens* as figured by Ratzeburg, differ in a somewhat similar manner.

The smooth basal portion of the antennal club is smaller in this than in the other species, and the sutures of the apical portion are less curved, being, in fact, nearly straight; in these respects it tends towards one of the groups of *Tomicus* (*pini*, *interruptus*, &c.), but differs by the elevated margin of the posterior declivity not extending to the tip, and by the sparse confused puncturing of the elytra; the tibiæ are less dilated than usual, and armed with a few not very prominent teeth, very nearly as in the preceding species, to which it is evidently allied.

C.—Body moderately slender, cylindrical, tip of elytra obliquely declivous, scarcely flattened, without tubercles; funiculus of antennæ 5-jointed—*DRYOCETES* Eichhoff.

15. *X. septentrionis*.—*Bostrichus sept.* Mannh. Bull. Mosc. 1843, 298; *Bostrichus semicastaneus* Mannh., *ibid*, 1852, 358.

Alaska, Lake Superior, Hudson Bay Territory, Canada, New York. With a large series of specimens before me, and types of both of the descriptions of Mannerheim, I perceive no differences which permit them to be distinguished as species. The specimens of *semicastaneus* have no appearance of a smooth dorsal prothoracic line; the single Alaskan *septentrionis* has it feebly apparent; in other specimens from Lake Superior, New York and Virginia it is quite obvious.

16. **X. affaber**.—*Bostrichus affaber* Mannh. Bull. Mosc. 1852, 359.

Alaska and Lake Superior. Differs from the preceding by its smaller size, and by the prothorax being slightly asperated in front.

17. **X. granicollis**.—Ferruginous, elongate cylindrical, sparsely clothed with erect hairs; head with a few granules and punctures; prothorax longer than wide, densely granulate on the whole surface, scarcely more strongly in front than behind, smooth dorsal line narrow, scarcely visible; elytra with rows of large quadrate punctures, intervals narrow, with single rows of small punctures; sutural stria well impressed, tip obliquely declivous, not flattened, but slightly retuse from the depth of the subsutural furrow. Long. 2 mm.

One specimen found in the mountains of Sullivan county, Pennsylvania. Much resembles in its sculpture *Crypturgus striatulus* Lec., but differs totally in the form and structure of the antennal club.

TOMICUS Latr.

This genus in its most restricted sense corresponds with the subgenus *Bostrychus* of Dr. Zimmermann, and is easily recognized by the antennal club being corneous on the posterior face, and divided on the other side by sutures which are angulated or sinuate, the principal convexity of the suture being directed forwards; the funiculus is always composed of five distinct joints, and the tibiæ are strongly toothed. The declivous portion of the elytra is deeply excavated, the excavation is margined behind, the margin extends to the suture a little in front of the sutural angle, and is strongly toothed at the sides; the punctures are arranged in distant rows, the intervals broad and flat, sometimes marked with a few punctures, sometimes smooth.

According to the form of the sutures of the antennal club, our species represent three divisions:

A.—Sutures of the club angulated, the point of the angle directed forwards.

1. **T. calligraphus** Germ. Ins. Nov. 461.—*Bostrichus exesus* Say; ? *Tomicus præmorsus* Eichhoff. Berl. Ent. Zeitschr. 1867, 401. (Ante, p. 147 = *B. exesus*.)

A larger form, 7 mm. long, occurs in New Mexico.

2. **T. cacographus**.—Cylindrical, dark-brown, or ferruginous, sparsely clothed with long yellow hairs; similar in sculpture to the preceding, but a little more slender in form; the disc of the prothorax behind the middle is feebly punctured, the punctures of the elytral striæ are transverse, and those of the intervals are well marked; the posterior excavation is armed each side with but five teeth, of which the most anterior one is very small, the 3d large, 2d still larger, 4th and 5th moderate in size, the posterior elevated margin is not longer than in *T. calligraphus*, not dentate, but perfect in outline, as in *T. pini*. Long. 3.5 mm.

Southern and Western States. Varies in color like the other species. I have two large specimens, more than 4 mm. long, one from Arizona and one from Illinois which do not seem to differ appreciably from the smaller eastern specimens of this species.

3. *T. plastographus*.—Also of the same form and sculpture as *T. calligraphus*; the middle part of the disc of the prothorax behind is less punctured, with a narrow smooth space; the striæ of the elytra are composed of transverse punctures, and the intervals as far as the 5th are nearly free from punctures; the subsutural interval is, however, somewhat rugose towards the declivity, as in that species; the declivity is less deeply excavated, and armed each side with but four teeth, the anterior one being very small, the 2d and 3d large, somewhat connected together, and the 4th moderate in size, the posterior elevated margin is as long as in *T. pini*, extending one-third the circumference of the excavation. Long. 4—5 mm.

California, one specimen. This species so resembles in the armature of the posterior excavation of the elytra *T. pini*, that I confounded it with that species. On close comparison, however, the differences are quite apparent, consisting not only in the transverse and coarser punctures of the elytral striæ, but in the sutures of the antennal club, which are strongly angulated at the middle, and again in a backward direction near the inner side.

B.—Antennal club with the first suture nearly straight, 2d bisinuate; posterior margin of the declivity of the elytra much longer.

4. *T. pini*.—*Bostrichus pini* Say; *Tomicus præfrictus* Eichhoff, Berl. Ent. Zeitschr. 1867, 401. (Ante, p. 147.)

Atlantic States, Canada, Oregon. In this species the punctures of the rows of the elytra are not transverse, and the intervals are nearly free from punctures; the posterior declivity is deeply excavated, acutely margined below for rather more than one-third of its circumference, and armed each side with four teeth, of which the 1st is small, the 3d usually longer than the 2d, but more or less connected with it, the 4th shorter than the 3d, and acute. The thorax is deeply, but rather finely punctured behind towards the middle, with a narrow, ill defined, smooth dorsal space. Long. 4 mm.

A larger and somewhat stouter form occurs in the Hudson Bay Territory, but I am not disposed to view it as indicating a different species. Four specimens are in my collection, and I have seen several others; they are about 5.5 mm. long, and are more hairy than the ordinary form.

A smaller specimen from Hudson Bay Territory differs from *T. interruptus* by the head being shorter and more coarsely punctured, just as in *T. pini*, but the intervals of the elytra have rows of very distant punctures, not so numerous as in *T. interruptus*, and the striæ are composed of more close set punctures, as in *T. pini*. It is probably a distinct species, but I am unwilling to impose a name upon the single specimen before me.

5. *T. interruptus*.—*Bostrichus interruptus* Mannh. Bull. Mosc. 1852, 357.

Alaska. This species is of the same size and form as the smaller race of *T. pini*, but is more hairy, with the elytral striæ composed of more distant punctures, and the intervals marked with rows of punctures but little smaller than those of the striæ; the posterior declivity is just as in *T. pini*; the punctures of the hind part of the thorax are rather deeper and more distant. The part of the head in front of the eyes is longer and more finely punctured than in *T. pini*. Long. 4.5 mm.

6. *T. tridens*.—*Bostrichus tridens* Mannh. Bull. Mosc. 1852, 357.

Alaska, one specimen. Of the same form and sculpture as *T. interruptus*, but the head in front of the eyes is longer and more finely punctured, and strongly retuse in the middle, with the anterior face of the elevation somewhat impressed. The punctures of the striæ of the elytra are still more distant, and those of the intervals nearly as large as those of the striæ, though less numerous; the posterior excavation is precisely as in *T. interruptus*.

7. *T. avulsus* Eichhoff, Berl. Ent. Zeitschr. 1867, 402. (Ante, p. 147.)

Southern States. Easily distinguished by its small size and by the less deeply excavated and less strongly toothed posterior declivity of the elytra.

C.—Sutures of the antennal club strongly curved, but not angulated.

8. *T. concinnus*.—*Bostrichus concinnus* Mannh. Bull. Mosc. 1852, 358.

Alaska, three specimens. A very distinct species, having the apical declivity of the elytra less deeply excavated, with the posterior margin acute, but only slightly elevated, and armed with but three teeth each side, of which the 3d is the longest. The elytra are punctured in a confused manner, without distinct traces of striæ.

MICRACIS Lec.

The body in this genus is elongate, cylindrical, with the posterior declivity of the elytra convex, and the suture prolonged into an acute point. The club of the antennæ is oval, compressed, finely pubescent, with an elongated basal smooth spot, (the representative of the basal joint as in *Scolytus*), extending for more than half its length; the other sutures form loops parallel with this smooth space; the funiculus is 5-jointed, the 1st joint as long as the others united; the 2—5 are closely connected, gradually becoming shorter and broader, forming a conical mass. The scape of the antennæ is broadly dilated and fringed towards the extremity with very long hairs, almost as in some of the genera allied to *Platypus*.

1. *M. suturalis*.—Slender, cylindrical, blackish-brown, antennæ yellow, scape broadly triangular, flattened, fringed towards the tip with very long yellow hairs; head concave; prothorax one-half longer than wide, sides parallel behind the middle, rounded in front, base feebly rounded; surface dull with fine reticulations, and scattered granules gradually becoming larger and acute in front of the middle, where color becomes reddish brown. Elytra with close rows of fine punctures, connected by feeble transverse rugosities, pubescence fine and short; posterior declivity convex, sutural angle prolonged into a short acute point. Long. 2.5 mm.

Illinois; four specimens sent me by Dr. Henry Shimer, as found on the prickly ash, into the wood of which it bores. This species differs from the next by its more slender form, finer pubescence, and less coarse elytral punctures.

2. *M. aculeatus*.—Slender, cylindrical, dark-brown, not shining, elytra and front part of thorax paler, antennæ yellow, scape triangular, fringed with long yellow coarse hairs, head flat, thinly fringed with long hairs; prothorax a little longer than wide, gradually narrowed and rounded on the sides from the base, which is feebly rounded, surface coarsely granulate, the granules becoming more acute in front of the middle; elytra with transverse punctures densely arranged in rows, and almost connected by intervening rugosities, intervals narrow, with the hairs arranged in lines, appearing like short bristles, posterior declivity slightly convex, not at all excavated or toothed, sutural angle prolonged into a short acute point. Long. 2.5 mm.

Southern States. Resembles in form the European *T. micrographus*, but differs generically by the structure of the antennal club. The scape of the antennæ is less broadly dilated than in the preceding species.

SCOLYTUS Geoffroy.

The species in my collection may be grouped as follows:

Venter deeply excavated and armed with long spines.....1. *quadrispinosus*.

Venter flat or slightly concave:

Elytral striæ well marked:

Punctures of intervals very small, without hair:

Venter coarsely punctured.....2. *fagi*.

Venter finely punctured.....3. *californicus*.

Punctures of intervals bearing short hairs.....4. *caryæ*.

Elytral striæ composed of more distant punctures:

Elytra thinly clothed with very long hair.....5. *muticus*.

Elytra glabrous, or nearly so:

2d ventral segment not tuberculate.....6. *sulcatus*.

2d ventral segment with a small apical tubercle.....7. *ventralis*.

1. *S. quadrispinosus* Say, Journ. Acad. Nat. Sc. iii, 323.

Southern and Western States; rare. The specimen in my collection is altogether black, with the exception of the antennæ, which are rufous.

2. *S. fagi* Walsh, Practical Entomologist, ii, 58.—Black shining, head (♂) flattened, slightly concave, covered with erect yellow hair, rugosely punctured, prothorax oblong, narrowed in front, broadly rounded on the sides, punctures distant, finer upon the disc than at the sides, glabrous, except towards the front angles, where there are a few scattered hairs; elytra with distinct striæ formed of approximate subquadrate punctures, intervals broad, flat, marked with a row of fine distant punctures, tip rugosely punctured; venter strongly retuse in front, segments coarsely punctured except at the hind margins, which are smooth and slightly elevated; antennæ ferruginous, feet brown. Long. 5.5 mm.

One specimen from Illinois. Larger than our other species, and easily distinguished by the characters above given. The last ventral segment is feebly longitudinally impressed at the middle, and fringed behind with long hairs. Mr. Walsh mentions that this species lives upon the beech tree.

3. *S. californicus*.—Black shining, head (♂) slightly convex, finely and densely rugosely punctured, with very short erect hair; prothorax oblong, more strongly narrowed in front, very slightly rounded on the sides, moderately punctured, more finely on the disc than at the sides; elytra brown, with distinctly marked striæ, composed of close-set punctures, intervals broad, flat, each with a row of fine distant punctures, tip rugosely punctured; venter obtusely prominent at base, declivous part scarcely concave, segments finely punctured, third and fourth with a very small rounded tubercle at the middle of the hind margin; antennæ and feet brown. Long. 4.5 mm.

One specimen from California kindly sent me by Mr. Andrew Murray. The last ventral segment has a broad, shallow, somewhat transverse depression. Judging from the series of the next species before me, specimens with black elytra may be expected.

4. *S. caryæ* Riley, Prairie Farmer, Febr. 1867; Walsh, Pract. Entom. ii, 53.—Black shining, elytra sometimes yellowish-brown; head longitudinally aciculate, clothed with long hair, front feebly impressed transversely; prothorax a little longer than wide, narrowed in front, slightly rounded on the sides, not densely punctured, punctures at the middle very fine, at the sides tolerably coarse, and bearing a few short hairs; elytra with striæ composed of approximate small punctures bearing short gray hairs; tip rugosely punctured, and pubescent; venter with the declivity slightly concave, densely punctured behind, but more sparsely towards the base; the anterior margin of the declivity is acute, but not retuse; antennæ and feet yellowish-brown. Long. 4—5 mm.

New York, Nebraska: three specimens, which show no sexual difference. Said by Messrs. Walsh and Riley to affect hickory trees.

5. *S. muticus* Say, Journ. Acad. Nat. Sc. iii, 323.

One specimen, Pennsylvania. Easily recognized by the long hairs proceeding from the elytral punctures; the striæ are composed of large punctures, separated by a greater distance than their diameter, and the

intervals are marked with rows of equally distant punctures of little smaller size. The front in the male is flattened, and fringed with very long hair; the venter is coarsely punctured, concave towards the base, with the anterior margin of the declivity prominent and subacute; the hind margins of the third and fourth segments are smooth and obtusely elevated; the last segment has a longitudinal impression, and is very hairy behind.

6. *S. sulcatus*.—Blackish, elytra, antennæ and feet yellowish brown, head longitudinally aciculate, flattened, slightly hairy; prothorax not longer than wide, strongly narrowed in front, very feebly rounded on the sides, finely, not densely punctured, more distinctly at the sides; elytra with the punctures of the rows and intervals almost equal in size and distance, with a few short yellow hairs towards the side and tip, the tip, as usual, rugosely punctured; venter not densely punctured, anterior part of declivity prominent, subacute, posterior margin of the segments smooth and somewhat elevated. Long. 3.75 mm.

One female, New York. The color of the elytra is probably variable. Seems to resemble the European *S. rugulosus*.

7. *S. ventralis*.—Black, shining, head longitudinally aciculate and punctured, slightly convex and thinly clothed with short hair; prothorax oblong, a little longer than wide, slightly narrowed in front, feebly rounded on the sides, moderately punctured, more finely on the disc than at the sides; elytra with approximate rows of punctures, those of the striæ and intervals being equal in size and distance, and bearing very short grayish hairs; tip rugosely punctured; venter somewhat concave, strongly, but not densely punctured, second segment with a conspicuous tubercle at the middle of the hind margin; last segment more acutely margined than usual, antennæ ferruginous, feet dark-brown. Long. 4—4.5 mm.

Two specimens collected in Washington Territory, given to me by Mr. George Gibbs.

Tribe IV.—HYLURGINI.

The introduction of the genera *Chramesus*, *Cnesinus* and *Polygraphus* into our fauna requires a modification of the definition of this tribe.

The distinctions are to be found less in the degree of the dilatation of the third tarsal joint than in the obsolescence of the fourth joint, whereby the tarsi become in the tribe *Hylurgini* tetramerous, as in the normal *Rhynchophora*; besides this difference in the tarsi, the head is also larger and more prominent than in the *Tomicini*, and inserted in the axis of the prothorax, instead of at an angle, as it is in the tribe last named. The sculpture of the thorax is always uniform, a character rarely observed in the *Tomicini*, and the base of the elytra is frequently elevated, acute and serrate; finally the prolongation of the

head in front of the eyes is much more evident than in any of the *Tomicini*.

I would modify the table of our author as follows :

- A. Club of antennæ solid, large, much compressed, uniformly pubescent; tarsi with third joint not dilated, scarcely emarginate:
 - Funiculus very short, 1-jointed.....**Chramesus**.
 - Funiculus longer, 5-jointed.....**Polygraphus**.
- B. Club of antennæ lamellate.....**Phlæotribus**.
- C. Club of antennæ annulated:
 - a. Ventral segments subequal:
 - Club of antennæ oval, elongate or fusiform:
 - Front tibiæ serrate.....**Hylesinus**.
 - Front tibiæ coarsely toothed.....**Cnesinus**.
 - Club oval, smaller, subacute:
 - Tarsi with joints 1—3 equal.....**Hylurgus**.
 - Tarsi with first joint shorter.....**Carphoborus**.
 - Club short, broad, compressed and concave.....**Dendroctonus**.
 - b. First and fifth ventral segments elongate, sutures very deeply impressed:
 - Club small, oval, basal half glabrous.....**Hylastes**.

CHRAMESUS Lec. n. g.

Body oval, convex, covered with erect short bristles; head large, prominent, concave in the male, slightly convex in the female: eyes transverse, feebly emarginate, finely granulated; antennæ with the scape long and slender, nearly as long as the head, and very gradually enlarged towards the tip; funiculus of but one distinct joint, which is conical, not longer than wide; the remaining joints are obsolete, and visible only as a corneous ridge on the upper edge of the base of the club, which is very much compressed, uniformly pubescent, without trace of articulation on either face, as long as the head, less than half as wide as its length, oval subsecuriform, lower outline nearly straight, upper one curved, obtusely rounded at tip. Prothorax one-half wider than long, much narrowed in front, rounded on the sides, and less so at the tip. Elytra about twice as long as the thorax, convex, obtusely rounded behind, basal margin acute and subserrate, as in *Hylesinus*. Tibiæ dilated gradually, feebly serrate; tarsi with the joints 1—3 very short, 3d scarcely dilated, 4th joint nearly as long as the others united, with large claws.

C. hicoloræ.—Oval, convex, black, not shining, antennæ yellow; body clothed with short stiff ashy hairs, with rows of longer erect bristles upon the intervals of the elytra; head feebly punctured, deeply concave in the male; prothorax broader than long, strongly narrowed in front, coarsely, not densely punctured, feebly bisinuate at base; elytra very obsoletely striate, finely, not densely punctulate. Long. 1·5 mm.

Bred from twigs of hickory, similar to those from which Prof. S. S.

Haldeman obtained *Dysphaga*, near Columbia, Pennsylvania. I have also a specimen from Louisiana.

The head of the female is not concave, but has a well marked, small transverse impression on the front.

POLYGRAPHUS Er.

P. rufipennis.—*Apate* (*Lepisomus*) *rufipennis* Kirby, Fauna Bor. Am. iv, 193, tab. 8, fig. 2; *A. (L.) nigriceps*, Kirby, ib. 194; *P. saginatus* Mannh. Bull. Mosc. 1853, 237.

Alaska, Canada, Maine, Louisiana. The elytra are marked with inconspicuous rows of punctures; the intervals are flat, with fine, mostly transverse rugosities, and tolerably densely punctulate; the pubescence is short, coarse, depressed, and of a yellowish-gray color. Long. 2—2.5 mm. The eyes are divided as in *Xyloterus*. The front is slightly impressed in the male, and has a small medial tubercle, sometimes divided into two.

HYLESINUS Fabr.

The species of this genus may be grouped as follows:

A. Funiculus of antennæ as long as the club, with seven distinct joints:

Body densely covered with pale and dark scales:

Oval, club of antennæ fusiform:

Thorax muricate at the sides before the middle,.....1. **imperialis.**

Thorax not muricate.....2. **aculeatus.**

Elongate, club of antennæ ovate:

Thorax feebly constricted in front.....3. **sericeus.**

Thorax strongly constricted in front.....4. **nebulosus.**

Short and stout, club of antennæ nearly oval.....5. **fasciatus.**

Body sparsely clothed with short yellow hairs; club of antennæ

oval.....6. **opaculus.**

B. Funiculus of antennæ shorter than the club, 6-jointed, joints

2—6 closely united into a conical mass:

Elytra with deep striæ, intervals rough, the alternate ones acutely tuberculate near the tip, (pubescence short:)

2 mm.—1st and 3d intervals only slightly elevated.....7. **dentatus.**

3.5 mm.—1st and 3d intervals strongly elevated and tuberculate behind.....8. **serratus.**

4 mm.—1st interval feebly elevated, 3d strongly so behind.....9. **cristatus.**

Elytra with rows of large punctures, intervals punctured, 3d retuse near the tip and acutely toothed, (pubescence long).....10. **hystrix.**

A.

In all these species the funiculus of the antennæ is 7-jointed, with the joints 2—7 nearly equal; the club is uniformly finely pubescent, except in *H. fasciatus*, where the basal portion is more shining.

1. **H. imperialis** Eichh. Berl. Ent. Zeitschr. 1868, 149.

Dacota and Arizona. Of the same form and color as *H. aculeatus*,

but differs by the conspicuous muricated points near the apex of the prothorax.

3. *H. sericeus* Mannh. Bull. Mosc. 1852, 385.—*Hylurgus ser.* Mannh. ibid. 1843, 296; 1852, 356.

Alaska and California.

4. *H. nebulosus* Lec. Proc. Acad. Nat. Sci. Phila. 1859, 285.

California and Oregon.

5. *H. fasciatus*.—Elliptical, convex, brownish-black, slightly pubescent, densely covered with black opaque scales; head concave, with a narrow polished median line; prothorax twice as wide as long, strongly narrowed in front, broadly rounded on the sides, near the base and tip with bands of pale scales and hairs, the hinder one broadly interrupted at the middle; elytra with a band before the middle, consisting of a large sutural spot and some smaller ones towards the sides, a narrow, nearly complete band behind the middle, composed of pale ashy scales; tip with a few ashy scales; striæ deep, punctured. Long. 1.5 mm.

One specimen, York county, Pennsylvania. The club of the antennæ is one-half longer than wide, regularly oval, less acute than usual, and the basal part is less pubescent and more shining.

6. *H. opaculus*.—Cylindrical, brownish-black, opaque, thinly clothed with short stiff yellow hairs; antennæ and feet ferruginous; head convex, thickly punctured; prothorax nearly as long as wide, narrowed in front, sides subsinuate near the tip; densely but not finely punctured, with a very narrow faint dorsal carina; elytra with striæ composed of deep subquadrate punctures, intervals narrow, rough with transverse rugosities. Long. 2.5 mm.

Two specimens, Pennsylvania. The club of the antennæ is subovate, nearly twice as long as wide, and more shining towards the base.

B.

7. *H. dentatus* Say, Journ. Acad. Nat. Sci. Phil. v, 258.

Middle and Northern States, and Oregon; under bark of *Juniperus*. This species, as observed by Say, strongly resembles in its specific characters *Phlæotribus frontalis*, but is always larger, being usually over 2 mm. long. In one sex the prothorax is much more rounded on the sides and more suddenly narrowed near the tip than in the other.

8. *H. serratus* Lec.

One specimen, New York.

9. *H. cristatus* Lec.

California, Mr. Ulke.

This and the preceding species closely resemble *H. dentatus* and differ chiefly by the larger size and by the greater elevation and stronger serration of the third interval on the posterior declivity of the elytra; *H. serratus* also has the sutural space strongly elevated and toothed, while in *H. cristatus*, although serrate, it is much less elevated.

10. **H. hystrix** Lec. Proc. Acad. Nat. Sci. Phila. 1858, 81.

San Diego, California. This and the three preceding species have the third joint of the tarsi less dilated than in those of division A, and rather emarginate than bilobed. They approach in this character and in the funiculus of the antennæ the genus *Hylurgus*, but differ by the larger club, the finely toothed tibiæ and the form of the body.

CNESINUS Lec. (n. g.)

Elongate cylindrical, head convex, beak very short, eyes oblique, transverse, broadly emarginated, finely granulated; antennæ with the scape as long as the funiculus, much curved, slender at base, moderately thickened towards the tip; first joint of the funiculus thick, as broad as long, remaining joints forming an elongate mass, gradually becoming wider externally, showing under a high magnifying power the appearance of six closely connected joints; club elongate oval, somewhat shining except at tip, feebly pubescent, transversely annulate, the sutures furnished with fringes of long hairs; prothorax longitudinally aciculate; elytra deeply striate, convex at tip, basal edge acute and serrate; front tibiæ dilated, armed externally near the tip, which is prolonged, with large acute teeth; middle and hind tibiæ dilated, feebly serrate; tarsi with the joints 1—3 moderately dilated, 3d emarginate, 4th slender, as long as the two preceding united; 1st joint of front tarsi shorter than the 2d, of the middle and hind tarsi equal to it.

The anterior coxæ are large and prominent, widely separated; the mesosternum is protuberant.

A peculiar genus, differing in appearance from the others of the tribe by the more cylindrical form, the prothorax being parallel on the sides, except near the apex, where they are rounded. The sculpture of the prothorax is also unusual, being composed of dense longitudinal aciculations.

C. strigicollis.—Cylindrical, dark brown, clothed with yellowish hairs, which are more stiff and arranged in rows upon the elytra; front flattened, nearly smooth, with a fringe of yellow hairs; prothorax longer than wide, convex, sides parallel to near the tip, where they are rounded, tip two-thirds as wide as the base; disc uniformly and densely covered with short longitudinal aciculate punctures; elytra with deep punctured striæ, intervals flat, with very fine rugosities; tip obliquely declivous, and broadly sulcate along the suture. Long. nearly 3 mm.

Two specimens, Illinois.

HYLURGUS Latr.

This genus as defined by Dr. Zimmermann is equivalent to *Hylastes* Er., and the species will be referred to under that heading. The one described below, however, corresponds exactly with the European type, having the club small, oval, rather thick, distinctly annulated, pointed at the tip, very thinly pubescent, shining and nearly glabrous at the base; the funiculus is as long as the club, and composed of 6 distinct joints, of which the 2nd to the 5th gradually increase in width, the 1st is larger and thicker than the others. The tibiae are dilated, and armed with a few distinct teeth near the tip. The tarsi are broken in my specimen, but are described as having the 3rd joint emarginate, not wider than the 2d. The body is long and cylindrical, shining, with a few fine erect hairs on the elytra, which are feebly striate with rows of punctures; the intervals are marked with irregular double series of very small punctures, and single rows of very small tubercles gradually becoming larger towards the tip, which is convex, and broadly sulcate along the 2d interval, which is free from tubercles on the declivous portion.

H. analogus.—Differs from the European *H. ligniperda* by the thorax being strongly but not densely punctured, without any distinct smooth dorsal line. Long. 4 mm.

One specimen, New York; more slender in form than our *Dendroctonus* and easily recognized by its more shining appearance.

CARPHOBORUS Eichhoff.

This genus is quite distinct by the 1st joint of the tarsi being shorter than the 2d; the 3d is not broader, and is moderately emarginate, the 4th is as long as the others united: the tibiae are dilated and distinctly toothed towards the tip, the front pair are armed with a strong hook at the inner angle as in *Dendroctonus* from which this genus differs by the form of the antennal club, and the shape of the body, which is slender and cylindrical. The club is oval, thick, a little longer than wide, transversely annulated, obtuse at tip, glabrous at base: the funiculus is 5-jointed, the 1st joint larger and thicker, the others forming a conical mass.

C. bifurcus Eichh. Berl. Ent. Zeitschr. 1868, 147. (Ante, p. 148.)

DENDROCTONUS Er.

Following the example of the latest European authors, I would restrict this name to the species having a short broadly rounded club, rather truncate at tip, shining and nearly glabrous over its whole surface, strongly compressed and concave externally; the funiculus is composed of 5 distinct joints, the 1st thick and rounded, the others gradually

becoming wider and forming a conical mass, about as long as the club: the scape is more thickened at tip than in the allied genera, being more than twice as wide as the 1st joint of the funiculus.

The tibiae are very strongly toothed on the outer margin, the 1st joint of the tarsi is longer than the 2d, and the 3d is broader and bilobed, the front tibiae are armed with a strong apical hook. The 2d, 3d and 4th ventral sutures are strongly bent backwards at the margin, as in some Curculionidae; a character not seen in any of the allied genera.

Our species may be tabulated as follows:

A. Prothorax narrowed in front:

Intervals of elytra rough for their whole extent, hairs moderate:

Thorax very densely coarsely punctured.....1. *terebrans*.

Thorax less densely punctured.....2. *obesus*.

Intervals of elytra rough in front, only punctured behind, hairs long:

Thorax unequally punctured.....3. *rufipennis*.

Thorax more sparsely punctured, intervals of elytra less rough.4. *punctatus*.

Thorax strongly punctured, intervals of elytra scarcely granulated, even in front.....5. *simplex*.

B. Prothorax scarcely narrowed in front, head very large:

Intervals of the elytra slightly rough, pubescence short... ..6. *frontalis*.

1. *D. terebrans* Lac. Gen. Col. vii, 361.=*D. valens* Lec. Pac. R. R. Explorations, xi, Ins. 59. (Ante, p. 149.)

The synonym belongs to a larger form of this species, found in California and Oregon.

2. *D. obesus*.=*Hylurgus obesus* Mannh. Bull. Mosc. 1843, 296; *ibid.* 1852, 356: *D. similis* Lec. Pac. R. R. Explor. xi, Ins. 59.

Alaska and Oregon. A smaller form, only 4 mm. long, occurs at Lake Superior and in Canada.

3. *D. rufipennis*.=*Hylurgus rufipennis* Kirby, Faun. Bor. Am. iv, 195, *vide* Mannh. Bull. Mosc. 1853, 238.

Alaska: the punctures of the thorax are not very dense, and of two sizes intermixed.

4. *D. punctatus*.—Of the same form as *D. terebrans*. The erect hairs are much longer, the punctures of the prothorax much less dense, and the elytra are roughened only near the base, the intervals being finely and sparsely punctured behind, without elevated granules. Long. 6 mm.

One specimen, northern New York.

5. *D. simplex*.—Of the same form as the smaller race of *D. obesus*, but with the thorax more coarsely punctured, the elytra less roughened in front, more obliquely declivous and somewhat flattened behind, with the intervals on the declivity absolutely free from tubercles, and marked only with ranges of piliferous punctures; the sutural stria is much deeper. Long. 4 mm.

Two specimens from Canada are in my collection.

6. *D. frontalis* Zimm. (Ante, p. 149.)

HYLASTES Er.

In this genus the nearest approach is made to the Cossonide type of Rhynchophora. The front part of the head is more distinctly prolonged into a short stout beak, which is obliquely excavated on the side, for the reception of the scape of the antennæ. The funiculus consists of 7 distinct joints, of which the 1st is but little larger than the 2d; from the 2d to the 7th they are gradually a little wider; the club is small, oval, not compressed, distinctly annulate; the basal half is shining and nearly glabrous; the prosternum is deeply excavated for the reception of the head; the tibiæ are broadly dilated and serrate; the joints of the tarsi 1—3 are equal in length, the 3d emarginate, or bilobed, the 4th equal to the two preceding united, not much thickened at the tip. The 1st and 5th ventral segments are conspicuously longer than the intermediate ones, and the sutures are straight, and very deeply impressed.

The chief character relied on by Dr. Zimmermann for the distinction of his genus *Hylurgus*, which corresponds with this, is generally true but not very obvious; but the scutellum is always on a level with the base of the elytra, and the base of the thorax is not bisinuate, as in *Dendroctonus*.

Hylastes pumilus Er., does not belong to the genus nor tribe, and is referred to *Aphanarthrum* on page 152.

The species before me may be grouped in the following manner, after the two divisions established by Erichson.

A.—Mesosternum truncate in front, third tarsal joint emarginate, not dilated; tibiæ coarsely toothed:

a.—Beak more or less carinated:

1. *H. porculus* Er. (Ante, p. 149 = *H. scabripennis*.)
2. *H. cavernosus* Zimm. (Ante, p. 149.)
3. *H. nigrinus* Mannh. Bull. Mosc. 1852, 356, (*Hylurgus*); ibid. 385.

Alaska, Oregon and California. Very similar to *H. cavernosus*, but the sides of the thorax are almost parallel for three-quarters of their length, then rounded to the tip; the punctuation is more dense and the elytra more rugose and more pure black.

4. *H. gracilis*.—Elongate, blackish-brown, elytra and club of antennæ somewhat paler, thinly clothed with very short yellowish pubescence; head densely but not coarsely punctured; beak finely and distinctly carinate, broadly transversely impressed near the tip; prothorax coarsely punctured, with a somewhat indistinct smooth dorsal line; it is longer than wide, and nearly straight on the sides, the apex is broadly rounded, the base very feebly rounded; elytra not wider than the thorax, with striæ composed of large quadrate punctures, intervals narrow, rugose and sparsely punctulate, convex towards the tip and suture; tibiæ coarsely serrate. Long. nearly 4 mm.

Two specimens. Tahoe Valley, California, Dr. J. G. Cooper. Much more slender than the preceding species.

5. *H. macer*.—Elongate, black, thinly clothed with very short inconspicuous yellow hairs; head densely and finely punctured, front with a feeble transverse curved impression at the base of the beak, which is finely carinate; prothorax nearly one-half longer than wide, oval, with the base slightly rounded, deeply and coarsely punctured, punctures becoming smaller and more dense at the sides, dorsal line very narrow, slightly elevated; elytra with rows of quadrate punctures, intervals wider than the striae, thickly punctured and somewhat rugose; antennae dark brown. Long. nearly 6 mm.

California, Dr. Horn; Nebraska, Mr. Ulke. Allied to *H. porosus*, but the mesosternum is not conical and protuberant, but truncate as in *H. nigrinus*; the thorax is longer than in either of the species named, and is almost regularly oval, except at the base, which is very broadly rounded.

6. *H. porosus*.—Elongate, black, slightly shining, thinly clothed with short erect yellowish hairs, arranged in rows upon the elytra; head densely punctured, beak carinate, deeply transversely impressed at the base; prothorax longer than wide, narrowed in front, feebly rounded on the sides, apex rounded, base nearly truncate, disc tolerably thickly covered with large punctures and a few small punctures intermixed, dorsal line narrow but conspicuous, extending from the base nearly to the tip; elytra not wider than the thorax, with striae composed of large quadrate punctures, intervals strongly rugose and finely punctured, the sutural and third slightly elevated behind, and marked each with a row of very small tubercles; tibiae serrate, with a few larger teeth near the tip. Long. 4.5 mm.

California, two specimens; one sent me by Mr. Andrew Murray, the other collected at Cabo de los Reyes, by Mr. George Davidson. This species has nearly the form of *H. nigrinus*, but differs from it as well as from all the others of this division by the deep transverse frontal impression at the base of the beak; the mesosternum is slightly protuberant, though much less so than in the species of division B; the 3d tarsal joint is however not dilated as in those species, and the front tibiae have a few large teeth near the tip.

b.—Beak not carinated.

7. *H. tenuis* Zimm. (Ante, p. 149.)

B.—Mesosternum obtusely protuberant; third tarsal joint dilated, bilobed; front tibiae rather finely toothed.

a. Front not impressed:

8. *H. granulatus*.—Oblong cylindrical, brownish-black, finely and thinly pubescent, with short yellow hairs, and with rows of short bristles upon the elytra; head convex, densely punctured, beak very distinctly carinate, carina

ending between the front of the eyes; beak strongly impressed transversely at tip; prothorax not longer than wide, gradually narrowed from the base for about three-fifths of its length, then more rapidly to the tip; feebly impressed on the sides near the apex, densely and confluent rugose, producing a coarsely granulated surface; base more distinctly bisinuate than usual; elytra with rows of quadrate punctures, intervals wide, slightly convex, strongly rugous and marked each with a row of small granules, bearing stiff yellow hairs; basal margin acute, sub serrate; antennæ and feet nearly black, front tibiæ finely serrate. Long. 5 mm.

Two specimens, Oregon, Mr. George Gibbs. This species and *H. pinifex* are more robust than the others, resembling in form *Dendroctonus*.

b.—Front transversely impressed.

9. *H. pinifex* Fitch, Noxious Ins. N. York. 4th report, p. 43, No. 248.

Lake Superior, Canada, Ohio. Also stout in form, like a *Dendroctonus*. The front has a curved transverse impression at the base of the beak, which is marked with a short carina, and a transverse apical impression; the thorax is densely covered with punctures of two sizes, and is finely carinated; it is distinctly narrowed in front, with the sides feebly rounded almost to the apex, which is slightly tubulate; the elytra are deeply striate, the striæ marked with quadrate punctures, the intervals broad, convex behind and towards the suture, deeply rugose, each with a row of small tubercles especially obvious behind, bearing short yellow bristles; the basal margin is acute and sub serrate; the pubescence is short and fine, becoming nearly squamiform behind, the front tibiæ are distinctly, though not coarsely serrate. Long. 5 mm.

10. *H. rugipennis* Mannh. Bull. Mosc. 1853, 238. = *Hylurgus rug.* Mann. ib. 1843, 297.

Alaska, Oregon and California. Resembles *H. pinifex*, but is narrower, the frontal impression is deeper, and somewhat smooth at the bottom; the prothorax is more densely and more uniformly punctured, the striæ of the elytra are less deep, the intervals are more finely punctured and rugous, but marked in the same way with rows of tubercles; the basal margin is acute and sub serrate; the front tibiæ are moderately toothed near the tip. Long. 4—4.5 mm.

11. *H. subcostulatus* Mannh. Bull. Moc. 1853, 239.

The original locality was Alaska, but I refer to this species specimens from Oregon and from Tahoe Valley, California.

The body is cylindrical, densely clothed with scale-like yellowish-brown hairs, sometimes forming a crust and concealing the sculpture;

the head is densely and finely punctured, with a transverse impression just in front of the eyes, and another near the tip of the beak, which is feebly carinate; prothorax not longer than wide, strongly narrowed in front, broadly impressed on the sides near the tip; punctuation fine and very dense, with scattered, very large punctures intermixed; elytra with deep striæ of large quadrate punctures, intervals convex, rugose and tuberculate, the suture and alternate ones more elevated and serrate; front tibiæ with a few moderate teeth near the tip. Long. 4 mm.

The following species are unknown to me :

Cryphalus striatulus Mannerheim, Bull. Mosc. 1853, 235.—Alaska.

Bostrichus terminalis Mannerheim, Bull. Mosc. 1843, 298.—California.

Tomicus grandicollis Eichhoff, Berl. Ent. Zeitschr. 1867, 402.

Tomicus decretus Eichhoff, Berl. Ent. Zeitschr. 1867, 402. (Seems allied to *Xyleborus cælatus*.)

Apate (Lepisomus) brevicornis Kirby, Fauna Bor. Amer. iv, 194.—Hudson Bay Territory.

Apate rufitarsis Kirby, Fauna Bor. Amer. iv, 193.—Hudson Bay Territory.

Phlaeophthorus granicollis Eichhoff, Berl. Ent. Zeitschr. 1868, 149.—Carolina, Tennessee.

Hylesinus? globosus Eichhoff, Berl. Ent. Zeitschr. 1868, 149.—Amer. bor.

Hylesinus pruinosis Eichhoff, Berl. Ent. Zeitschr. 1868, 149. (Seems not to differ from *H. aculeatus* Say, in any essential character.)

Dendroctonus? graniger Eichhoff, Berl. Ent. Zeitschr. 1868, 147.—Texas.

Dendroctonus? Haagii Eichhoff, Berl. Ent. Zeitschr. 1868, 148.—Amer. bor.

Hylastes cristatus Mannerheim, Bull. Mosc. 1853, 239.—Alaska.

Hylastes salebrosus Eichhoff, Berl. Entom. Zeitschr. 1868, 146.—Carolina.

Hylastes rufipes Eichhoff, Berlin Entom. Zeitschr. 1868, 147.—Carolina.

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